

## **ABSTRACT**

A process and system for processing a thin film sample (e.g., a semiconductor thin film), as well as the thin film structure are provided. In particular, a beam generator can be controlled to emit at least one beam pulse. With this beam pulse, at least one portion of the film sample is irradiated with sufficient intensity to fully melt such section of the sample throughout its thickness, and the beam pulse having a predetermined shape. This portion of the film sample is allowed to resolidify, and the re-solidified at least one portion is composed of a first area and a second area. Upon the re-solidification thereof, the first area includes large grains, and the second area has a region formed through nucleation. The first area surrounds the second area and has a grain structure which is different from a grain structure of the second area. The second area is configured to facilitate thereon an active region of an electronic device.